STAT

Issue No 2, October 1950, of the Monthly 'Meteorology and Hydrology' (Complete Except for Two Articles*)

Symposium of 6 Articles, 8 Notes, and 1 Book Review.

Source: Meteorologiya i Gidrologiya, No 2, pp 1-19 and pp 34-64 (Note: pp 20-33 omitted).

STAT

Leningrad: October 1950.

STAT

MAIN ADMINISTRATION OF THE HYDROMETEOROLOGICAL SERVICE

ATTACHED TO THE COUNCIL OF MINISTERS USSR

METEOROLOGY

AND

HYDROLOGY

[see pp 114-5 for contents]

A Monthly

Scientific-Technical

Journal

No 2

OCTOBER

1950

HYDROMETEOROLOGICAL PUBLISHING HOUSE

LENINGRAD

GM-L-97

Editorial Offices: Moscow, 104, ul. Gor'kogo, d. 18a

COMMUNISM'S GREAT CONSTRUCTION WORKS AND THE AIMS OF THE HYDROMETEOROLOGICAL SERVICE

The historic decree of the Council of Ministers USSR and the TsK VKP(b) of 20 October 1948 on field-protective forest plantings, introduction of grassland crop rotations and creation of reservoirs and tanks, and the new decrees of the Council of Ministers USSR issued in August and September of the current year on the construction of the Kuybyshev, Stalingrad and Kakhov hydroelectric power plants, the South-Ukraine and North-Crimea canals, and also the Main Turkmen canal with three hydroelectric power plants, are links in the one brilliant Stalin plan for transformation of nature and creation of the material foundation of a communist society.

It has not even been two years yet since the first historic decree, approved in accordance with the personal initiative of Comrade Stalin, was issued. And already more than one million three hundred thousand hectares are covered with young green saplings -- protective forest belts, and hundreds of new reservoirs and tanks have been built. The 1950 annual plan for forest-planting in steppe and forest-steppe regions of the European territory USSR has already been overfulfilled in the spring of this year.

The new decrees of the Council of Ministers USSR are directed toward complex solution of highly important national-economic problems. They specify gigantic measures for creation of new power bases for industry and agriculture, creation of gigantic irrigation systems for purposes of agricultural utilization of vast new territories of the Caspian deserts and semideserts, and also measures for future

expansion and improvement of water transport mains.

The grand scales of all these measures have no equals in all the history of mankind. Only the land of socialism, led by communism's great architect I.V. Stalin, has the power to state and solve such problems. In the accomplishment of these measures the Soviet people rightly see the beginning of the epoch of communism and therefore arise with enormous enthusiasm to the selfless struggle for fulfillment of their great constructive plans.

Utilization of the drop in the Volga waters in the section between Kalinin and Stalingrad for production of electric power can yield 32 milliard kilowatt-hours. With the introduction of the Kuybyshev and Stalingrad hydroelectric power plants into the system, together with the now operating Ivan'kov and Shcherbakov stations, 80 percent of the energy resources of the Volga will be utilized. The Kyubyshev and Stalingrad hydroelectric power plants alone will give the country 20 milliard kilowatt-hours per year, that is, a quantity of energy 10 times greater than the electric energy which was being generated in prerevolutionary Russia, or more than half the energy being generated by all the electric power stations of the USSR in 1938, or more than the annual production of electric power in Italy, or in Sweden and Switzerland put together.

The construction of the largest scale hydrological power ganglia in the world on the Volga constitutes a striking new page in the history of socialist construction. In their power the Kuybyshev and Stalingrad hydroelectric power plants will considerably surpass Dneproges and will together reach almost four million kilowatts.

When they have entered the system -- the first in 1955 and the second in 1956 -- they will deliver almost half their power to the capital of our Fatherland, Moscow.

The construction of dams and hydroelectric power stations on the Volga will make it possible to irrigate and supply with water about 14 million hectares of highly fertile ground, at present not being exploited at all or being only partially exploited due to the shortage of water. It is planned that 12 milliard cubic meters of Volga water will be delivered for irrigation and watering of the left bank of the Volga alone.

Moreover, the construction of high-power hydroelectric plants will be connected with a considerable expansion of water transport. Thus the reservoirs of the Kuybyshev and Stalingrad stations will be extended to a length of 1,000 kilometers. The enterapment of spring water in these reservoirs and their gradual depletion in summer will make it possible to maintain the fixed water level in lower-lying regions at a higher level. The Kuybyshev and Stalingrad reservoirs will be the largest in the world. The waterhead behind the Kuybyshev dam will extend beyond Cheboksara along the Volga and beyond the mouth of the Vyatka along the Kama. The waterhead behind the Stalingrad dam will extend almost to Kuybyshev.

Also specified by decree of the Council of Ministers USSR are three great reservoirs connected with the construction of the Main Turkmen Canal. One of them is on the Amu Darya River in the region of Nukus and two on the Main Turkmen Canal. The length of the Main Turkmen Canal is specified at 1,100 kilometers; the water discharge in it should amount to 350 to 400 cubic meters per second, with the possibility of bringing it susequently to 600 cubic meters

per second. The canal will pass along a route from Takhia-Tash on the Amy Darya, by-passing Sarykamysh Basin (which would take about 15 years to fill in), and thence through the Kara-Kuma desert, along the ancient channel of the Uzba in the waterless regions of the Caspian lowland. This canal will be widely used for navigation by the river fleet. Thus there arises a possibility of navigation by vessels and transport of freight by an inexpensive water route from deep in the Central Asian rayons along the Amu Darya, thence along the Main Turkmen Canal, over the Caspian Sea to the Volga and up the Volga, Oka and Kama. This measure will relieve the railroad transport considerably and will reduce hauling costs.

However, this canal is chiefly designated for irrigation and agricultural utilization for one million three hundred thousand hectares of new land, with the aim of developing cotton culture, guaranteeing water supply for industrial concerns, and watering up to seven million hectares of pasture land in the Kara-Kuma desert. For these purposes the creation of large irrigation and water-supply canals branching out from the Main Turkmen Canal, a reservoir of an overall length of 1,200 kilometers and large pipe-lines of an overall length of 1,000 kilometers is projected. The pipe-lines will serve to supply water for industrial concerns and populated points, in particular the city of Krasnovodsk. This gigantic construction should be completed in 1957.

Construction of the Kakhovsk hydroelectric power plant on the Dnepr, with a capacity of 250,000 kilowatts and generation of about one milliard two hundred million killowatt hours of electric energy on the average, according to the wetness of the year, will be retained in the Kakhovsk reservoir.

For irrigation and watering of three million two hundred thousand hectares of land in the southern rayons of the Ukraine and northern rayons of the Crimea, construction of the South-Ukraine and North-Crimea canals, with an overall length of 550 kilometers, is projected. The South-Ukraine Canal will take up to 600-650 cubic meters of water per second at Zaporozh'ye on the Dnepr and carry this water to Molochnaya River, where a 6 milliard cubic meter reservoir will be constructed for reception of flood waters, and thence in the direction of Askaniya-Nova to Sivash. Here the water will be passed on into the North-Crimea Canal and will follow to Dzhankaya and through the steppe rayons of the Crimea to Kerch. The South Ukraine Canal will also be joined with the Kakhov reservoir by a canal 60 kilometers long for self-flowing irrigation of the lands adjacent to it.

At all the large dams -- Kuybyshev, Stalingrad and Kakhov -- bridge railroad crossings over the Volga and Dnepr will be constructed. The bridge crossings will allow for the straightening of existing railroad lines and for the creation of new lines.

Together with construction of dams, reservoirs, sluices, bridge crossings and canals the government's decrees specify a broad program of future development of field-protective forest plantings. In the Kara-Kuma desert the forst belts will go along both sides of the Main Turkmen Canal and will be not less than two kilometers wide. Forest belts will also border the branch irrigation and water-supply canals, the borders of oases, of industrial centers and of populated points. Great works are also planned in afforestation and fixing of sand. In all, in accordance with the government decision, about 500,000 hectares of forest plantings will be

laid in the canal zone alone.

Forest planting is specified in the northern part of the Caspian lowland between the Volga and Ural rivers, in the Serpin lowland and Nogay [illegible] steppe. Great works are specified in creation of protective forest plantings in the southern steppe rayons of the Ukraine and in North Crimea. Forest plantings will be carried out for purposes of fixing the sands of the lower Dnepr area.

The realization of this truly majestic program will allow considerable expansion of the area under cultivation for agricultural crops, in particular cotton in Central Asia, the Crimea and the Ukraine, and also attainment of high and consistent yields in those regions which often suffer from drought and dry winds. Animal husbandry in the irrigated and watered rayons will receive a secure feed basis. Industry and agriculture will receive incomparably more electric power for manufacture and processing of raw materials. All this put together will create an abundance of agricultural and industrial products.

The carrying out of these measures is one part of the realization of the magnificent program for creation of the material basis for a communist society outlined by Comrade Stalin as far back as 9 February 1946 in his historic speech. These measures are at the same time a grand plan for the transformation of nature and improvement of climatic conditions.

At the present time it is still difficult to appreciate fully all the benefits which will accrue to the national economy through the realization of the great Stalin plan for the transformation of

nature. It is altogether obvious and indisputable that as a result of the realization of this plan considerable changes in the climate of our Fatherland will come about in those regions where irrigation and watering will be conducted. The indicated rayons will get from the Volga, Amu-Darya, Terek and Dnepr rivers a quantity of water more than twice as great as the total quantity they receive from precipitation. This water, together with that stored in ponds, tanks and great reservoirs will evaporate, thus promoting local humidification of the air and lowering of its excessively high temperatures. It is known, for example, that the maximum daily temperature in a desert oasis is found to be five to six degrees lower than that in the surrounding desert.

But noticeable improvement of climate will occur not only in directly irrigated rayons. The magnificence of the scope of the planned measures in territory of irrigation and watering and, chiefly, forest planting cannot but lead to appreciable climatic changes over large expanses of the steppe and forest-steppe zone. Scientific researches conducted in recent times have shown that in the air over our territory huge quantities of moisture are transferred, of which only a small percentage falls to the earth's surface in the form of precipitation. Together with this it has been discovered that the creation of forest belts will increase the roughness of the earth's surface, as a result of which the vertical components of turbulent motion in the flow of air bearing moisture from the ocean will be strengthened, and this in turn will lead to a certain increase in the quantity of precipitation.

On the basis of preliminary research one may suppose that the quantity of precipitation will not increase very considerably.

But even a small increase in precipitation cannot be disregarded. An increase in precipitation cannot occur without an increase of cloudiness, which in turn leads to a decrease in the radiation incident upon the earth's surface. The decrease of radiation and additional expenditure of heat in evaporation will lead to a certain lowering of the temperature of the air and to its humidification.

To what has been indicated it must be added that forest belts stipulate somewhat later (in comparison with those now observed) periods of melting of the snow cover, decrease in the runoff of thaw waters and general decrease of runoff. The enumerated factors, together with others less essential, cannot but lead to a favorable change of climate over large expanses of the south of our country.

To date, sufficiently strict quantitative calculation of the changes of climate which will arise in connection with realization of the brilliant Stalin plan for the transformation of nature have not yet been conducted. Execution of all these calculations is one of the most immediate tasks of the science-research organs of the Hydrometeorological Service.

One of the most important problems affixed to the problem of determining the change in climatic elements is the determination of the expenditure of water in evaporation from the surfaces of reservoirs, irrigation canals and the irrigated regions themselves. Such losses of water to evaporation cannot be small, and it is necessary to calculate them in connection with the designing of all the hydrotechnical constructions of the Stalin plan for the transformation of nature. The same pertains to losses of water to

infiltration into the underlying layers of the soil.

Creation of the Main Turkmen Canal, which will take a considerable part of the water discharge of the Amu-Darya River, will undoubtedly lead to a lowering of the level of the Aral Sea. Lowering of the level of such a large body of water as the Aral Sea cannot but be substantially reflected in the activity of the national-economic organizations which are connected with it in one or another degree.

Lowering of the level of the Aral Sea will occasion a lowering of the level of the salt groundwaters in the Amu-Darya delta, which should reflect extremely favorably upon the saltiness of the soils in this rayon, since the current high level of the Aral Sea and the ground water does not allow flushing of the salt soils to be carried out with proper effect.

Lowering of the level of the Aral Sea will also contribute to a decrease in danger of flooding of the rayons of Khorezm Oblast and Kara-Kalpak ASSR adjacent to the Amu-Darya. At the same time, lowering of the level cannot but give rise to some reorganization of, and additional work in, guaranteeing normal navigation on the Aral Sea.

It is also obvious that the gradual lowering of the level of the Aral Sea which will be stipulated by the decrease of flow of Amu-Darya waters into it will lead to an increase in the saltiness of the waters of this sea. This in turn may affect the fishing trade, since it is possible that certain species of fish which under present conditions are found in the Aral Sea may not in the future (with increased slatiness) be able to grow. Therefore steps